EXHIBIT A29

DIFFRACTION VERIFICATIONS

1) M69757-005
2) M69757-007

VERIFICATION OF ZERO DEGREE AMPHIBOLE DIFFRACTION PATTERNS

CAMERA CONSTANT (pixelÅ) = SPACING (Å)
MEASURED DISTANCE (pixels)

1) **The calculated spacings should be within +/- 5% of the 001 d-spacing (interrow spacing). The acceptable range for all of the amphiboles is given in the chart below. The page number is given to locate the file card in the Mineral Powder Diffraction File Data book for each type of amphibole and the interrow spacing is given for each amphibole.**

Amphibole Type	Pg. #	Card #	Calculated Spancing	Range +/- 5%
Grunerite	449	31-631	5.2	4.94 - 5.46
Actinolite	4	25-157	5.13	4.87 - 5.39
Tremolite	1192	13-437	5.09	4.84 - 5.34
Crocidolite	993	19-1061	5.19	4.93 - 5.45
Anthophyllite	48	9-455	5.28	5.02 - 5.54

VERIFICATION OF AMPHIBOLE DIFFRACTION PATTERN AT ZERO TILT

Camera K (pixelÅ)	Meas. Distance (pixels)	Calculate Spacing (Å)
192.4	36	5.34

Streaking Observed: _____ **Closely spaced dots:** _____

Type of amphibole diffraction verified: Anthophyllite

MAS Job #: M69757-005-001 **Film #:** 310979

Analyst: JGC **Date of Photo:** 12/15/2018

Date Verified: 12/17/2018 **EDS Verified:** Yes

Zone Axis Information
d(hk0) =
d(hkl) =
Angle =
ZA =

VERIFICATION OF ZERO DEGREE AMPHIBOLE DIFFRACTION PATTERNS

CAMERA CONSTANT (pixelÅ) = SPACING (Å)
MEASURED DISTANCE (pixels)

1) **The calculated spacings should be within +/- 5% of the 001 d-spacing (interrow spacing). The acceptable range for all of the amphiboles is given in the chart below. The page number is given to locate the file card in the Mineral Powder Diffraction File Data book for each type of amphibole and the interrow spacing is given for each amphibole.**

Amphibole Type	Pg. #	Card #	Calculated Spancing (Å)	Range +/- 5%
Grunerite	449	31-631	5.2	4.94 - 5.46
Actinolite	4	25-157	5.13	4.87 - 5.39
Tremolite	1192	13-437	5.09	4.84 - 5.34
Crocidolite	993	19-1061	5.19	4.93 - 5.45
Anthophyllite	48	9-455	5.28	5.02 - 5.54

VERIFICATION OF AMPHIBOLE DIFFRACTION PATTERN AT ZERO TILT

Camera K (pixelÅ)	Meas. Distance (pixels)	Calculate Spacing (Å)
192.4	37	5.20

Streaking Observed: _____ **Closely spaced dots:** _____

Type of amphibole diffraction verified: Anthophyllite

MAS Job #: M69757-005-001 Diff 2 **Film #:** 310981

Analyst: JGC **Date of Photo:** 12/15/2018

Date Verified: 12/17/2018 **EDS Verified:** Yes

Zone Axis Information
d(hk0) =
d(hkl) =
Angle =
ZA =

VERIFICATION OF ZERO DEGREE AMPHIBOLE DIFFRACTION PATTERNS

CAMERA CONSTANT (pixelÅ) = SPACING (Å)
MEASURED DISTANCE (pixels)

1) The calculated spacings should be within +/- 5% of the 001 d-spacing (interrow spacing). The acceptable range for all of the amphiboles is given in the chart below. The page number is given to locate the file card in the Mineral Powder Diffraction File Data book for each type of amphibole and the interrow spacing is given for each amphibole.

Amphibole Type	Pg. #	Card #	Calculated Spancing (Å)	Range +/- 5%
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Actinolite	4	25-157	5.13	4.87 - 5.39
Tremolite	1192	13-437	5.09	4.84 - 5.34
Crocidolite	993	19-1061	5.19	4.93 - 5.45
Anthophyllite	48	9-455	5.28	5.02 - 5.54

VERIFICATION OF AMPHIBOLE DIFFRACTION PATTERN AT ZERO TILT

Camera K (pixelÅ)	Meas. Distance (pixels)	Calculate Spacing (Å)
192.4	37	5.20

Streaking Observed: _____ **Closely spaced dots:** _____

Type of amphibole diffraction verified: Anthophyllite

MAS Job #: M69757-005-002 **Film #:** 311005

Analyst: JGC **Date of Photo:** 12/15/2018

Date Verified: 12/17/2018 **EDS Verified:** Yes

Zone Axis Information
d(hk0) =
d(hkl) =
Angle =
ZA =

VERIFICATION OF ZERO DEGREE AMPHIBOLE DIFFRACTION PATTERNS

CAMERA CONSTANT (pixelÅ) = SPACING (Å)
MEASURED DISTANCE (pixels)

1) **The calculated spacings should be within +/- 5% of the 001 d-spacing (interrow spacing). The acceptable range for all of the amphiboles is given in the chart below. The page number is given to locate the file card in the Mineral Powder Diffraction File Data book for each type of amphibole and the interrow spacing is given for each amphibole.**

Amphibole Type	Pg. #	Card #	Calculated Spancing (Å)	Range +/- 5%
Grunerite	449	31-631	5.2	4.94 - 5.46
Actinolite	4	25-157	5.13	4.87 - 5.39
Tremolite	1192	13-437	5.09	4.84 - 5.34
Crocidolite	993	19-1061	5.19	4.93 - 5.45
Anthophyllite	48	9-455	5.28	5.02 - 5.54

VERIFICATION OF AMPHIBOLE DIFFRACTION PATTERN AT ZERO TILT

Camera K (pixelÅ)	Meas. Distance (pixels)	Calculate Spacing (Å)
192.4	35	5.50

Streaking Observed: _____ **Closely spaced dots:** _____

Type of amphibole diffraction verified: Anthophyllite

MAS Job #: M69757-005-002 Diff 2 **Film #:** 311008

Analyst: JGC **Date of Photo:** 12/15/2018

Date Verified: 12/17/2018 **EDS Verified:** Yes

Zone Axis Information
d(hk0) =
d(hkl) =
Angle =
ZA =

VERIFICATION OF ZERO DEGREE AMPHIBOLE DIFFRACTION PATTERNS

CAMERA CONSTANT (pixelÅ) = SPACING (Å)
MEASURED DISTANCE (pixels)

1) **The calculated spacings should be within +/- 5% of the 001 d-spacing (interrow spacing). The acceptable range for all of the amphiboles is given in the chart below. The page number is given to locate the file card in the Mineral Powder Diffraction File Data book for each type of amphibole and the interrow spacing is given for each amphibole.**

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Crocidolite	993	19-1061	5.19	4.93 - 5.45
Anthophyllite	48	9-455	5.28	5.02 - 5.54

VERIFICATION OF AMPHIBOLE DIFFRACTION PATTERN AT ZERO TILT

Camera K (pixelÅ)	Meas. Distance (pixels)	Calculate Spacing (Å)
192.4	37	5.20

Streaking Observed: _____ **Closely spaced dots:** _____

Type of amphibole diffraction verified: Anthophyllite

MAS Job #: M69757-005-003 **Film #:** 311012

Analyst: JGC **Date of Photo:** 12/15/2018

Date Verified: 12/17/2018 **EDS Verified:** Yes

Zone Axis Information
d(hk0) =
d(hkl) =
Angle =
ZA =

VERIFICATION OF ZERO DEGREE AMPHIBOLE DIFFRACTION PATTERNS

CAMERA CONSTANT (pixelÅ) = SPACING (Å)
MEASURED DISTANCE (pixels)

1) **The calculated spacings should be within +/- 5% of the 001 d-spacing (interrow spacing). The acceptable range for all of the amphiboles is given in the chart below. The page number is given to locate the file card in the Mineral Powder Diffraction File Data book for each type of amphibole and the interrow spacing is given for each amphibole.**

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Crocidolite	993	19-1061	5.19	4.93 - 5.45
Anthophyllite	48	9-455	5.28	5.02 - 5.54

VERIFICATION OF AMPHIBOLE DIFFRACTION PATTERN AT ZERO TILT

Camera K (pixelÅ)	Meas. Distance (pixels)	Calculate Spacing (Å)
192.4	37	5.20

Streaking Observed: _____ **Closely spaced dots:** _____

Type of amphibole diffraction verified: Anthophyllite

MAS Job #: M69757-005-003 Diff 2 **Film #:** 311014

Analyst: JGC **Date of Photo:** 12/15/2018

Date Verified: 12/17/2018 **EDS Verified:** Yes

Zone Axis Information
d(hk0) =
d(hkl) =
Angle =
ZA =

VERIFICATION OF ZERO DEGREE AMPHIBOLE DIFFRACTION PATTERNS

CAMERA CONSTANT (pixelÅ) = SPACING (Å)
MEASURED DISTANCE (pixels)

1) **The calculated spacings should be within +/- 5% of the 001 d-spacing (interrow spacing). The acceptable range for all of the amphiboles is given in the chart below. The page number is given to locate the file card in the Mineral Powder Diffraction File Data book for each type of amphibole and the interrow spacing is given for each amphibole.**

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Crocidolite	993	19-1061	5.19	4.93 - 5.45
Anthophyllite	48	9-455	5.28	5.02 - 5.54

VERIFICATION OF AMPHIBOLE DIFFRACTION PATTERN AT ZERO TILT

Camera K (pixelÅ)	Meas. Distance (pixels)	Calculate Spacing (Å)
192.4	35	5.50

Streaking Observed: _____ **Closely spaced dots:** _____

Type of amphibole diffraction verified: Anthophyllite

MAS Job #: M69757-005-004 **Film #:** 311019

Analyst: JGC **Date of Photo:** 12/15/2018

Date Verified: 12/17/2018 **EDS Verified:** Yes

Zone Axis Information
d(hk0) =
d(hkl) =
Angle =
ZA =

VERIFICATION OF ZERO DEGREE AMPHIBOLE DIFFRACTION PATTERNS

CAMERA CONSTANT (pixelÅ) = SPACING (Å)
MEASURED DISTANCE (pixels)

1) **The calculated spacings should be within +/- 5% of the 001 d-spacing (interrow spacing). The acceptable range for all of the amphiboles is given in the chart below. The page number is given to locate the file card in the Mineral Powder Diffraction File Data book for each type of amphibole and the interrow spacing is given for each amphibole.**

Amphibole Type	Pg. #	Card #	Calculated Spancing (Å)	Range +/- 5%
Grunerite	449	31-631	5.2	4.94 - 5.46
Actinolite	4	25-157	5.13	4.87 - 5.39
Tremolite	1192	13-437	5.09	4.84 - 5.34
Crocidolite	993	19-1061	5.19	4.93 - 5.45
Anthophyllite	48	9-455	5.28	5.02 - 5.54

VERIFICATION OF AMPHIBOLE DIFFRACTION PATTERN AT ZERO TILT

Camera K (pixelÅ)	Meas. Distance (pixels)	Calculate Spacing (Å)
192.4	35.5	5.42

Streaking Observed: _____ **Closely spaced dots:** _____

Type of amphibole diffraction verified: Anthophyllite

MAS Job #: M69757-005-004 Diff 2 **Film #:** 311020

Analyst: JCG **Date of Photo:** 12/15/2018

Date Verified: 12/17/2018 **EDS Verified:** Yes

Zone Axis Information
d(hk0) =
d(hkl) =
Angle =
ZA =

VERIFICATION OF ZERO DEGREE AMPHIBOLE DIFFRACTION PATTERNS

CAMERA CONSTANT (pixelÅ) = SPACING (Å)
MEASURED DISTANCE (pixels)

1) **The calculated spacings should be within +/- 5% of the 001 d-spacing (interrow spacing). The acceptable range for all of the amphiboles is given in the chart below. The page number is given to locate the file card in the Mineral Powder Diffraction File Data book for each type of amphibole and the interrow spacing is given for each amphibole.**

Amphibole Type	Pg. #	Card #	Calculated Spancing (Å)	Range +/- 5%
Grunerite	449	31-631	5.2	4.94 - 5.46
Actinolite	4	25-157	5.13	4.87 - 5.39
Tremolite	1192	13-437	5.09	4.84 - 5.34
Crocidolite	993	19-1061	5.19	4.93 - 5.45
Anthophyllite	48	9-455	5.28	5.02 - 5.54

VERIFICATION OF AMPHIBOLE DIFFRACTION PATTERN AT ZERO TILT

Camera K (pixelÅ)	Meas. Distance (pixels)	Calculate Spacing (Å)
192.4	36.5	5.27

Streaking Observed: _____ **Closely spaced dots:** _____

Type of amphibole diffraction verified: Anthophyllite

MAS Job #: M69757-005-005 **Film #:** 311026

Analyst: JGC **Date of Photo:** 12/15/2018

Date Verified: 12/17/2018 **EDS Verified:** Yes

Zone Axis Information
d(hk0) =
d(hkl) =
Angle =
ZA =

VERIFICATION OF ZERO DEGREE AMPHIBOLE DIFFRACTION PATTERNS

CAMERA CONSTANT (pixelÅ) = SPACING (Å)
MEASURED DISTANCE (pixels)

1) **The calculated spacings should be within +/- 5% of the 001 d-spacing (interrow spacing). The acceptable range for all of the amphiboles is given in the chart below. The page number is given to locate the file card in the Mineral Powder Diffraction File Data book for each type of amphibole and the interrow spacing is given for each amphibole.**

Amphibole Type	Pg. #	Card #	Calculated Spancing (Å)	Range +/- 5%
Grunerite	449	31-631	5.2	4.94 - 5.46
Actinolite	4	25-157	5.13	4.87 - 5.39
Tremolite	1192	13-437	5.09	4.84 - 5.34
Crocidolite	993	19-1061	5.19	4.93 - 5.45
Anthophyllite	48	9-455	5.28	5.02 - 5.54

VERIFICATION OF AMPHIBOLE DIFFRACTION PATTERN AT ZERO TILT

Camera K (pixelÅ)	Meas. Distance (pixels)	Calculate Spacing (Å)
192.4	35.5	5.42

Streaking Observed: _____ **Closely spaced dots:** _____

Type of amphibole diffraction verified: Anthophyllite

MAS Job #: M69757-005-005 Diff 2 **Film #:** 311027

Analyst: JGC **Date of Photo:** 12/15/2018

Date Verified: 12/17/2018 **EDS Verified:** Yes

Zone Axis Information
d(hk0) =
d(hkl) =
Angle =
ZA =

VERIFICATION OF ZERO DEGREE AMPHIBOLE DIFFRACTION PATTERNS

CAMERA CONSTANT (pixelÅ) = SPACING (Å)
MEASURED DISTANCE (pixels)

1) The calculated spacings should be within +/- 5% of the 001 d-spacing (interrow spacing). The acceptable range for all of the amphiboles is given in the chart below. The page number is given to locate the file card in the Mineral Powder Diffraction File Data book for each type of amphibole and the interrow spacing is given for each amphibole.

Amphibole Type	Pg. #	Card #	Calculated Spancing (Å)	Range +/- 5%
Grunerite	449	31-631	5.2	4.94 - 5.46
Actinolite	4	25-157	5.13	4.87 - 5.39
Tremolite	1192	13-437	5.09	4.84 - 5.34
Crocidolite	993	19-1061	5.19	4.93 - 5.45
Anthophyllite	48	9-455	5.28	5.02 - 5.54

VERIFICATION OF AMPHIBOLE DIFFRACTION PATTERN AT ZERO TILT

Camera K (pixelÅ)	Meas. Distance (pixels)	Calculate Spacing (Å)
192.4	35.5	5.42

Streaking Observed: _____ **Closely spaced dots:** _____

Type of amphibole diffraction verified: Anthophyllite

MAS Job #: M69757-005-006 **Film #:** 311033

Analyst: JGC **Date of Photo:** 12/16/2018

Date Verified: 12/17/2018 **EDS Verified:** Yes

Zone Axis Information
d(hk0) =
d(hkl) =
Angle =
ZA =

VERIFICATION OF ZERO DEGREE AMPHIBOLE DIFFRACTION PATTERNS

CAMERA CONSTANT (pixelÅ) = SPACING (Å)
MEASURED DISTANCE (pixels)

1) The calculated spacings should be within +/- 5% of the 001 d-spacing (interrow spacing). The acceptable range for all of the amphiboles is given in the chart below. The page number is given to locate the file card in the Mineral Powder Diffraction File Data book for each type of amphibole and the interrow spacing is given for each amphibole.

Amphibole Type	Pg. #	Card #	Calculated Spancing (Å)	Range +/- 5%
Grunerite	449	31-631	5.2	4.94 - 5.46
Actinolite	4	25-157	5.13	4.87 - 5.39
Tremolite	1192	13-437	5.09	4.84 - 5.34
Crocidolite	993	19-1061	5.19	4.93 - 5.45
Anthophyllite	48	9-455	5.28	5.02 - 5.54

VERIFICATION OF AMPHIBOLE DIFFRACTION PATTERN AT ZERO TILT

Camera K (pixelÅ)	Meas. Distance (pixels)	Calculate Spacing (Å)
192.4	36.5	5.27

Streaking Observed: _____ **Closely spaced dots:** _____

Type of amphibole diffraction verified: Anthophyllite

MAS Job #: M69757-005-006 Diff 2 **Film #:** 311035

Analyst: JGC **Date of Photo:** 12/16/2018

Date Verified: 12/17/2018 **EDS Verified:** Yes

Zone Axis Information
d(hk0) =
d(hkl) =
Angle =
ZA =

VERIFICATION OF ZERO DEGREE AMPHIBOLE DIFFRACTION PATTERNS

CAMERA CONSTANT (pixelÅ) = SPACING (Å)
MEASURED DISTANCE (pixels)

1) **The calculated spacings should be within +/- 5% of the 001 d-spacing (interrow spacing). The acceptable range for all of the amphiboles is given in the chart below. The page number is given to locate the file card in the Mineral Powder Diffraction File Data book for each type of amphibole and the interrow spacing is given for each amphibole.**

Amphibole Type	Pg. #	Card #	Calculated Spancing	Range +/- 5%
Grunerite	449	31-631	5.2	4.94 - 5.46
Actinolite	4	25-157	5.13	4.87 - 5.39
Tremolite	1192	13-437	5.09	4.84 - 5.34
Crocidolite	993	19-1061	5.19	4.93 - 5.45
Anthophyllite	48	9-455	5.28	5.02 - 5.54

VERIFICATION OF AMPHIBOLE DIFFRACTION PATTERN AT ZERO TILT

Camera K (pixelÅ)	Meas. Distance (pixels)	Calculate Spacing (Å)
810.7	411.6	1.97

Streaking Observed: _____ **Closely spaced dots:** _____

Type of amphibole diffraction verified: Anthophyllite

MAS Job #: M69757-007-001 **Film #:** NA

Analyst: JC **Date of Photo:** 12/15/2018

Date Verified: 12/18/2018 **EDS Verified:** YES

Zone Axis Information

d(hk0) = 10.1
d(hkl) = 1.97
Angle = 83
ZA =

VERIFICATION OF ZERO DEGREE AMPHIBOLE DIFFRACTION PATTERNS

CAMERA CONSTANT (pixelÅ) = SPACING (Å)
MEASURED DISTANCE (pixels)

1) **The calculated spacings should be within +/- 5% of the 001 d-spacing (interrow spacing). The acceptable range for all of the amphiboles is given in the chart below. The page number is given to locate the file card in the Mineral Powder Diffraction File Data book for each type of amphibole and the interrow spacing is given for each amphibole.**

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Actinolite	4	25-157	5.13	4.87 - 5.39
Tremolite	1192	13-437	5.09	4.84 - 5.34
Crocidolite	993	19-1061	5.19	4.93 - 5.45
Anthophyllite	48	9-455	5.28	5.02 - 5.54

VERIFICATION OF AMPHIBOLE DIFFRACTION PATTERN AT ZERO TILT

Camera K (pixelÅ)	Meas. Distance (pixels)	Calculate Spacing (Å)
810.7	318.1	2.55

Streaking Observed: _____ **Closely spaced dots:** _____

Type of amphibole diffraction verified: Anthophyllite

MAS Job #: M69757-007-001 Diff 2 **Film #:** NA

Analyst: JC **Date of Photo:** 12/15/2018

Date Verified: 12/18/2018 **EDS Verified:** YES

Zone Axis Information

d(hk0) = 5.13
d(hkl) = 2.55
Angle = 69
ZA =

VERIFICATION OF ZERO DEGREE AMPHIBOLE DIFFRACTION PATTERNS

CAMERA CONSTANT (pixelÅ) = SPACING (Å)
MEASURED DISTANCE (pixels)

1) **The calculated spacings should be within +/- 5% of the 001 d-spacing (interrow spacing). The acceptable range for all of the amphiboles is given in the chart below. The page number is given to locate the file card in the Mineral Powder Diffraction File Data book for each type of amphibole and the interrow spacing is given for each amphibole.**

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Crocidolite	993	19-1061	5.19	4.93 - 5.45
Anthophyllite	48	9-455	5.28	5.02 - 5.54

VERIFICATION OF AMPHIBOLE DIFFRACTION PATTERN AT ZERO TILT

Camera K (pixelÅ)	Meas. Distance (pixels)	Calculate Spacing (Å)
810.7	160.3	5.06

Streaking Observed: _____ **Closely spaced dots:** _____

Type of amphibole diffraction verified: Anthophyllite

MAS Job #: M69757-007-002 **Film #:** NA

Analyst: JC **Date of Photo:** 12/16/2018

Date Verified: 12/18/2018 **EDS Verified:** YES

Zone Axis Information
d(hk0) =
d(hkl) =
Angle =
ZA =

VERIFICATION OF ZERO DEGREE AMPHIBOLE DIFFRACTION PATTERNS

CAMERA CONSTANT (pixelÅ) = SPACING (Å)
MEASURED DISTANCE (pixels)

1) **The calculated spacings should be within +/- 5% of the 001 d-spacing (interrow spacing). The acceptable range for all of the amphiboles is given in the chart below. The page number is given to locate the file card in the Mineral Powder Diffraction File Data book for each type of amphibole and the interrow spacing is given for each amphibole.**

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Crocidolite	993	19-1061	5.19	4.93 - 5.45
Anthophyllite	48	9-455	5.28	5.02 - 5.54

VERIFICATION OF AMPHIBOLE DIFFRACTION PATTERN AT ZERO TILT

Camera K (pixelÅ)	Meas. Distance (pixels)	Calculate Spacing (Å)
810.7	148.2	5.47

Streaking Observed: _____ **Closely spaced dots:** _____

Type of amphibole diffraction verified: Anthophyllite

MAS Job #: M69757-007-002 Diff 2 **Film #:** NA

Analyst: JC **Date of Photo:** 12/16/2018

Date Verified: 12/18/2018 **EDS Verified:** YES

Zone Axis Information
d(hk0) =
d(hkl) =
Angle =
ZA =

VERIFICATION OF ZERO DEGREE AMPHIBOLE DIFFRACTION PATTERNS

CAMERA CONSTANT (pixelÅ) = SPACING (Å)
MEASURED DISTANCE (pixels)

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Crocidolite	993	19-1061	5.19	4.93 - 5.45
Anthophyllite	48	9-455	5.28	5.02 - 5.54

VERIFICATION OF AMPHIBOLE DIFFRACTION PATTERN AT ZERO TILT

Camera K (pixelÅ)	Meas. Distance (pixels)	Calculate Spacing (Å)
810.7	147.6	5.49

Streaking Observed: _____ **Closely spaced dots:** _____

Type of amphibole diffraction verified: Anthophyllite

MAS Job #: M69757-007-003 **Film #:** NA

Analyst: JC **Date of Photo:** 12/16/2018

Date Verified: 12/18/2018 **EDS Verified:** YES

Zone Axis Information
d(hk0) =
d(hkl) =
Angle =
ZA =

VERIFICATION OF ZERO DEGREE AMPHIBOLE DIFFRACTION PATTERNS

CAMERA CONSTANT (pixelÅ) = SPACING (Å)
MEASURED DISTANCE (pixels)

1) **The calculated spacings should be within +/- 5% of the 001 d-spacing (interrow spacing). The acceptable range for all of the amphiboles is given in the chart below. The page number is given to locate the file card in the Mineral Powder Diffraction File Data book for each type of amphibole and the interrow spacing is given for each amphibole.**

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Anthophyllite	48	9-455	5.28	5.02 - 5.54

VERIFICATION OF AMPHIBOLE DIFFRACTION PATTERN AT ZERO TILT

Camera K (pixelÅ)	Meas. Distance (pixels)	Calculate Spacing (Å)
810.7	152.4	5.32

Streaking Observed: _____ **Closely spaced dots:** _____

Type of amphibole diffraction verified: Anthophyllite

MAS Job #: M69757-007-003 Diff 2 **Film #:** NA

Analyst: JC **Date of Photo:** 12/16/2018

Date Verified: 12/18/2018 **EDS Verified:** YES

Zone Axis Information
d(hk0) =
d(hkl) =
Angle =
ZA =

VERIFICATION OF ZERO DEGREE AMPHIBOLE DIFFRACTION PATTERNS

CAMERA CONSTANT (pixelÅ) = SPACING (Å)
MEASURED DISTANCE (pixels)

1) **The calculated spacings should be within +/- 5% of the 001 d-spacing (interrow spacing). The acceptable range for all of the amphiboles is given in the chart below. The page number is given to locate the file card in the Mineral Powder Diffraction File Data book for each type of amphibole and the interrow spacing is given for each amphibole.**

Amphibole Type	Pg. #	Card #	Calculated Spancing (Å)	Range +/- 5%
Grunerite	449	31-631	5.2	4.94 - 5.46
Actinolite	4	25-157	5.13	4.87 - 5.39
Tremolite	1192	13-437	5.09	4.84 - 5.34
Crocidolite	993	19-1061	5.19	4.93 - 5.45
Anthophyllite	48	9-455	5.28	5.02 - 5.54

VERIFICATION OF AMPHIBOLE DIFFRACTION PATTERN AT ZERO TILT

Camera K (pixelÅ)	Meas. Distance (pixels)	Calculate Spacing (Å)
810.7	157.1	5.16

Streaking Observed: _____ **Closely spaced dots:** _____

Type of amphibole diffraction verified: Anthophyllite

MAS Job #: M69757-007-004 **Film #:** NA

Analyst: JC **Date of Photo:** 12/16/2018

Date Verified: 12/18/2018 **EDS Verified:** YES

Zone Axis Information
d(hk0) =
d(hkl) =
Angle =
ZA =

VERIFICATION OF ZERO DEGREE AMPHIBOLE DIFFRACTION PATTERNS

CAMERA CONSTANT (pixelÅ) = SPACING (Å)
MEASURED DISTANCE (pixels)

1) **The calculated spacings should be within +/- 5% of the 001 d-spacing (interrow spacing). The acceptable range for all of the amphiboles is given in the chart below. The page number is given to locate the file card in the Mineral Powder Diffraction File Data book for each type of amphibole and the interrow spacing is given for each amphibole.**

Amphibole Type	Pg. #	Card #	Calculated Spancing (Å)	Range +/- 5%
Grunerite	449	31-631	5.2	4.94 - 5.46
Actinolite	4	25-157	5.13	4.87 - 5.39
Tremolite	1192	13-437	5.09	4.84 - 5.34
Crocidolite	993	19-1061	5.19	4.93 - 5.45
Anthophyllite	48	9-455	5.28	5.02 - 5.54

VERIFICATION OF AMPHIBOLE DIFFRACTION PATTERN AT ZERO TILT

Camera K (pixelÅ)	Meas. Distance (pixels)	Calculate Spacing (Å)
810.7	148.6	5.46

Streaking Observed: _____ **Closely spaced dots:** _____

Type of amphibole diffraction verified: Anthophyllite

MAS Job #: M69757-007-004 Diff 2 **Film #:** NA

Analyst: JC **Date of Photo:** 12/16/2018

Date Verified: 12/18/2018 **EDS Verified:** YES

Zone Axis Information

d(hk0) = 5.22
d(hkl) = 5.46
Angle = 90
ZA =

VERIFICATION OF ZERO DEGREE AMPHIBOLE DIFFRACTION PATTERNS

CAMERA CONSTANT (pixelÅ) = SPACING (Å)
MEASURED DISTANCE (pixels)

1) **The calculated spacings should be within +/- 5% of the 001 d-spacing (interrow spacing). The acceptable range for all of the amphiboles is given in the chart below. The page number is given to locate the file card in the Mineral Powder Diffraction File Data book for each type of amphibole and the interrow spacing is given for each amphibole.**

Amphibole Type	Pg. #	Card #	Calculated Spancing (Å)	Range +/- 5%
Grunerite	449	31-631	5.2	4.94 - 5.46
Actinolite	4	25-157	5.13	4.87 - 5.39
Tremolite	1192	13-437	5.09	4.84 - 5.34
Crocidolite	993	19-1061	5.19	4.93 - 5.45
Anthophyllite	48	9-455	5.28	5.02 - 5.54

VERIFICATION OF AMPHIBOLE DIFFRACTION PATTERN AT ZERO TILT

Camera K (pixelÅ)	Meas. Distance (pixels)	Calculate Spacing (Å)
810.7	147.9	5.48

Streaking Observed: _____ **Closely spaced dots:** _____

Type of amphibole diffraction verified: Anthophyllite

MAS Job #: M69757-007-005 **Film #:** NA

Analyst: JC **Date of Photo:** 12/16/2018

Date Verified: 12/18/2018 **EDS Verified:** YES

Zone Axis Information
d(hk0) =
d(hkl) =
Angle =
ZA =

VERIFICATION OF ZERO DEGREE AMPHIBOLE DIFFRACTION PATTERNS

CAMERA CONSTANT (pixelÅ) = SPACING (Å)
MEASURED DISTANCE (pixels)

1) **The calculated spacings should be within +/- 5% of the 001 d-spacing (interrow spacing). The acceptable range for all of the amphiboles is given in the chart below. The page number is given to locate the file card in the Mineral Powder Diffraction File Data book for each type of amphibole and the interrow spacing is given for each amphibole.**

Amphibole Type	Pg. #	Card #	Calculated Spancing (Å)	Range +/- 5%
Grunerite	449	31-631	5.2	4.94 - 5.46
Actinolite	4	25-157	5.13	4.87 - 5.39
Tremolite	1192	13-437	5.09	4.84 - 5.34
Crocidolite	993	19-1061	5.19	4.93 - 5.45
Anthophyllite	48	9-455	5.28	5.02 - 5.54

VERIFICATION OF AMPHIBOLE DIFFRACTION PATTERN AT ZERO TILT

Camera K (pixelÅ)	Meas. Distance (pixels)	Calculate Spacing (Å)
810.7	182.1	4.45

Streaking Observed: _____ **Closely spaced dots:** _____

Type of amphibole diffraction verified: Anthophyllite

MAS Job #: M69757-007-005 Diff 2 **Film #:** NA

Analyst: JC **Date of Photo:** 12/17/2018

Date Verified: 12/18/2018 **EDS Verified:** YES

Zone Axis Information

d(hk0) = 3.82
d(hkl) = 4.45
Angle = 105
ZA =

VERIFICATION OF ZERO DEGREE AMPHIBOLE DIFFRACTION PATTERNS

CAMERA CONSTANT (pixelÅ) = SPACING (Å)
MEASURED DISTANCE (pixels)

1) **The calculated spacings should be within +/- 5% of the 001 d-spacing (interrow spacing). The acceptable range for all of the amphiboles is given in the chart below. The page number is given to locate the file card in the Mineral Powder Diffraction File Data book for each type of amphibole and the interrow spacing is given for each amphibole.**

Amphibole Type	Pg. #	Card #	Calculated Spancing (Å)	Range +/- 5%
Grunerite	449	31-631	5.2	4.94 - 5.46
Actinolite	4	25-157	5.13	4.87 - 5.39
Tremolite	1192	13-437	5.09	4.84 - 5.34
Crocidolite	993	19-1061	5.19	4.93 - 5.45
Anthophyllite	48	9-455	5.28	5.02 - 5.54

VERIFICATION OF AMPHIBOLE DIFFRACTION PATTERN AT ZERO TILT

Camera K (pixelÅ)	Meas. Distance (pixels)	Calculate Spacing (Å)
810.7	153.4	5.28

Streaking Observed: _____ **Closely spaced dots:** _____

Type of amphibole diffraction verified: Actinolite

MAS Job #: M69757-007-006 **Film #:** NA

Analyst: JC **Date of Photo:** 12/16/2018

Date Verified: 12/18/2018 **EDS Verified:** YES

Zone Axis Information
d(hk0) =
d(hkl) =
Angle =
ZA =

VERIFICATION OF ZERO DEGREE AMPHIBOLE DIFFRACTION PATTERNS

CAMERA CONSTANT (pixelÅ) = SPACING (Å)
MEASURED DISTANCE (pixels)

1) **The calculated spacings should be within +/- 5% of the 001 d-spacing (interrow spacing). The acceptable range for all of the amphiboles is given in the chart below. The page number is given to locate the file card in the Mineral Powder Diffraction File Data book for each type of amphibole and the interrow spacing is given for each amphibole.**

Amphibole Type	Pg. #	Card #	Calculated Spancing (Å)	Range +/- 5%
Grunerite	449	31-631	5.2	4.94 - 5.46
Actinolite	4	25-157	5.13	4.87 - 5.39
Tremolite	1192	13-437	5.09	4.84 - 5.34
Crocidolite	993	19-1061	5.19	4.93 - 5.45
Anthophyllite	48	9-455	5.28	5.02 - 5.54

VERIFICATION OF AMPHIBOLE DIFFRACTION PATTERN AT ZERO TILT

Camera K (pixelÅ)	Meas. Distance (pixels)	Calculate Spacing (Å)
810.7	148.9	5.44

Streaking Observed: _____ **Closely spaced dots:** _____

Type of amphibole diffraction verified: Anthophyllite

MAS Job #: M69757-007-007 **Film #:** NA

Analyst: JC **Date of Photo:** 12/16/2018

Date Verified: 12/18/2018 **EDS Verified:** YES

Zone Axis Information
d(hk0) =
d(hkl) =
Angle =
ZA =

VERIFICATION OF ZERO DEGREE AMPHIBOLE DIFFRACTION PATTERNS

CAMERA CONSTANT (pixelÅ) = SPACING (Å)
MEASURED DISTANCE (pixels)

1) **The calculated spacings should be within +/- 5% of the 001 d-spacing (interrow spacing). The acceptable range for all of the amphiboles is given in the chart below. The page number is given to locate the file card in the Mineral Powder Diffraction File Data book for each type of amphibole and the interrow spacing is given for each amphibole.**

Amphibole Type	Pg. #	Card #	Calculated Spancing (Å)	Range +/- 5%
Grunerite	449	31-631	5.2	4.94 - 5.46
Actinolite	4	25-157	5.13	4.87 - 5.39
Tremolite	1192	13-437	5.09	4.84 - 5.34
Crocidolite	993	19-1061	5.19	4.93 - 5.45
Anthophyllite	48	9-455	5.28	5.02 - 5.54

VERIFICATION OF AMPHIBOLE DIFFRACTION PATTERN AT ZERO TILT

Camera K (pixelÅ)	Meas. Distance (pixels)	Calculate Spacing (Å)
810.7	492	1.65

Streaking Observed: _____ **Closely spaced dots:** _____

Type of amphibole diffraction verified: Anthophyllite

MAS Job #: M69757-007-007 Diff 2 **Film #:** NA

Analyst: JC **Date of Photo:** 12/16/2018

Date Verified: 12/18/2018 **EDS Verified:** YES

Zone Axis Information

d(hk0) = 5.34
d(hkl) = 1.65
Angle = 91
ZA =

VERIFICATION OF ZERO DEGREE AMPHIBOLE DIFFRACTION PATTERNS

CAMERA CONSTANT (pixelÅ) = SPACING (Å)
MEASURED DISTANCE (pixels)

1) **The calculated spacings should be within +/- 5% of the 001 d-spacing (interrow spacing). The acceptable range for all of the amphiboles is given in the chart below. The page number is given to locate the file card in the Mineral Powder Diffraction File Data book for each type of amphibole and the interrow spacing is given for each amphibole.**

Amphibole Type	Pg. #	Card #	Calculated Spancing (Å)	Range +/- 5%
Grunerite	449	31-631	5.2	4.94 - 5.46
Actinolite	4	25-157	5.13	4.87 - 5.39
Tremolite	1192	13-437	5.09	4.84 - 5.34
Crocidolite	993	19-1061	5.19	4.93 - 5.45
Anthophyllite	48	9-455	5.28	5.02 - 5.54

VERIFICATION OF AMPHIBOLE DIFFRACTION PATTERN AT ZERO TILT

Camera K (pixelÅ)	Meas. Distance (pixels)	Calculate Spacing (Å)
810.7	150.6	5.38

Streaking Observed: _____ **Closely spaced dots:** _____

Type of amphibole diffraction verified: Anthophyllite

MAS Job #: M69757-007-008 **Film #:** NA

Analyst: JC **Date of Photo:** 12/17/2018

Date Verified: 12/18/2018 **EDS Verified:** YES

Zone Axis Information
d(hk0) =
d(hkl) =
Angle =
ZA =

VERIFICATION OF ZERO DEGREE AMPHIBOLE DIFFRACTION PATTERNS

CAMERA CONSTANT (pixelÅ) = SPACING (Å)
MEASURED DISTANCE (pixels)

1) **The calculated spacings should be within +/- 5% of the 001 d-spacing (interrow spacing). The acceptable range for all of the amphiboles is given in the chart below. The page number is given to locate the file card in the Mineral Powder Diffraction File Data book for each type of amphibole and the interrow spacing is given for each amphibole.**

Amphibole Type	Pg. #	Card #	Calculated Spancing (Å)	Range +/- 5%
Grunerite	449	31-631	5.2	4.94 - 5.46
Actinolite	4	25-157	5.13	4.87 - 5.39
Tremolite	1192	13-437	5.09	4.84 - 5.34
Crocidolite	993	19-1061	5.19	4.93 - 5.45
Anthophyllite	48	9-455	5.28	5.02 - 5.54

VERIFICATION OF AMPHIBOLE DIFFRACTION PATTERN AT ZERO TILT

Camera K (pixelÅ)	Meas. Distance (pixels)	Calculate Spacing (Å)
810.7	280.9	2.89

Streaking Observed: _____ **Closely spaced dots:** _____

Type of amphibole diffraction verified: Anthophyllite

MAS Job #: M69757-007-008 Diff2 **Film #:** NA

Analyst: JC **Date of Photo:** 12/17/2018

Date Verified: 12/18/2018 **EDS Verified:** YES

Zone Axis Information

d(hk0) = 4.47
d(hkl) = 2.89
Angle = 89
ZA =

VERIFICATION OF ZERO DEGREE AMPHIBOLE DIFFRACTION PATTERNS

CAMERA CONSTANT (pixelÅ) = SPACING (Å)
MEASURED DISTANCE (pixels)

1) **The calculated spacings should be within +/- 5% of the 001 d-spacing (interrow spacing). The acceptable range for all of the amphiboles is given in the chart below. The page number is given to locate the file card in the Mineral Powder Diffraction File Data book for each type of amphibole and the interrow spacing is given for each amphibole.**

Amphibole Type	Pg. #	Card #	Calculated Spancing (Å)	Range +/- 5%
Grunerite	449	31-631	5.2	4.94 - 5.46
Actinolite	4	25-157	5.13	4.87 - 5.39
Tremolite	1192	13-437	5.09	4.84 - 5.34
Crocidolite	993	19-1061	5.19	4.93 - 5.45
Anthophyllite	48	9-455	5.28	5.02 - 5.54

VERIFICATION OF AMPHIBOLE DIFFRACTION PATTERN AT ZERO TILT

Camera K (pixelÅ)	Meas. Distance (pixels)	Calculate Spacing (Å)
810.7	205	3.95

Streaking Observed: _____ **Closely spaced dots:** _____

Type of amphibole diffraction verified: Anthophyllite

MAS Job #: M69757-007-009 **Film #:** NA

Analyst: JC **Date of Photo:** 12/17/2018

Date Verified: 12/18/2018 **EDS Verified:** YES

Zone Axis Information

d(hk0) = 4.69
d(hkl) = 3.95
Angle = 60
ZA =

VERIFICATION OF ZERO DEGREE AMPHIBOLE DIFFRACTION PATTERNS

CAMERA CONSTANT (pixelÅ) = SPACING (Å)
MEASURED DISTANCE (pixels)

1) **The calculated spacings should be within +/- 5% of the 001 d-spacing (interrow spacing). The acceptable range for all of the amphiboles is given in the chart below. The page number is given to locate the file card in the Mineral Powder Diffraction File Data book for each type of amphibole and the interrow spacing is given for each amphibole.**

Amphibole Type	Pg. #	Card #	Calculated Spancing (Å)	Range +/- 5%
Grunerite	449	31-631	5.2	4.94 - 5.46
Actinolite	4	25-157	5.13	4.87 - 5.39
Tremolite	1192	13-437	5.09	4.84 - 5.34
Crocidolite	993	19-1061	5.19	4.93 - 5.45
Anthophyllite	48	9-455	5.28	5.02 - 5.54

VERIFICATION OF AMPHIBOLE DIFFRACTION PATTERN AT ZERO TILT

Camera K (pixelÅ)	Meas. Distance (pixels)	Calculate Spacing (Å)
810.7	146.9	5.52

Streaking Observed: _____ **Closely spaced dots:** _____

Type of amphibole diffraction verified: Anthophyllite

MAS Job #: M69757-007-009 Diff 2 **Film #:** NA

Analyst: JC **Date of Photo:** 12/17/2018

Date Verified: 12/18/2018 **EDS Verified:** YES

Zone Axis Information
d(hk0) =
d(hkl) =
Angle =
ZA =